

What is claimed is:

1           1.     A cutting tool insert comprising:  
2           a cemented carbide body comprising  
3                 6-15 weight % Co, 0.2-1.8 weight % cubic carbides of Ti, Ta, Nb  
4           or any combination thereof, a highly W-alloyed binder phase with a CW-  
5           ratio of 0.78-0.93, and the balance WC; and  
6           a coating comprising  
7                 a first innermost layer of  $TiC_xN_yO_z$  wherein  $x+y+z=1$ , the first  
8           layer having a thickness of 0.1-1.5  $\mu m$  and equiaxed grains with size  $< 0.5$   
9            $\mu m$ ,  
10                 a second layer of  $TiC_xN_yO_z$  wherein  $x+y+z=1$ , the second layer  
11           having a thickness of 0.4-3.9  $\mu m$ , with columnar grains with an average  
12           diameter of 0.1-5.0  $\mu m$ ,  
13                 a third layer of a smooth fine-grained  $\kappa-Al_2O_3$  layer with a  
14           thickness of 0.5-5.5  $\mu m$ , and  
15                 a total thickness of the first innermost  $TiC_xN_yO_z$  and the second  
16            $TiC_xN_yO_z$  layer is 0.5-4.0  $\mu m$ , and the total thickness of all layers is 2.0-  
17           6.0  $\mu m$ .

1           2.     The cutting tool insert of claim 1, wherein the body comprises 9-12  
2           weight % Co and a CW ratio of 0.80-0.91.

1           3.     The cutting tool inset of claim 1, wherein in the first layer  $y > x$  and  
2            $z < 0.2$ , and the thickness of the first layer is 0.1-0.6  $\mu m$ .

1           4.     The cutting tool insert of claim 1, wherein in the second layer  $z=0$ ,  
2            $x > 0.3$  and  $y > 0.3$ , the second layer has a thickness of 1.5-3.0  $\mu m$ , with the  
3           columnar grains having an average diameter of 0.1-2.0  $\mu m$ .

12

1           5. The cutting tool insert of claim 1, wherein in the third layer the grains  
2 of the  $\kappa\text{-Al}_2\text{O}_3$  have a size on the order of  $0.5\text{-}2.0\text{ }\mu\text{m}$ , and the third layer has a  
3 thickness of  $0.5\text{-}3.0\text{ }\mu\text{m}$ .

1           6. The cutting tool insert of claim 1, wherein the total thickness of the first  
2 and second layers is  $1.5\text{-}3.5\text{ }\mu\text{m}$ .

1           7. The cutting tool insert of claim 1, wherein the total thickness of all the  
2 layers is  $3.0\text{-}5.0\text{ }\mu\text{m}$ .

1           8. The cutting insert of claim 1 further comprising an outermost layer of  
2 TiN having a thickness of  $0.1\text{-}1.0\text{ }\mu\text{m}$ .

1           9. The cutting insert of claim 8, wherein the outermost TiN-layer has been  
2 removed along the cutting edge.

1           10. A method of making a cutting tool insert comprising a WC-Co-based  
2 cemented carbide body with a highly W-alloyed binder phase and a CW-ratio of  
3  $0.78\text{-}0.93$ , the method comprising coating the body by the steps of:

4           forming a first innermost layer of  $\text{TiC}_x\text{N}_y\text{O}_z$  with a CVD-based technique,  
5 wherein  $x+y+z=1$ , the first layer having a thickness of  $0.1\text{-}1.5\text{ }\mu\text{m}$  and equiaxed  
6 grains with a size  $< 0.5\text{ }\mu\text{m}$ ,

7           forming a second layer of  $\text{TiC}_x\text{N}_y\text{O}_z$  by a MTCVD-technique, wherein  
8  $x+y+z=1$ , the second layer having a thickness of  $0.4\text{-}3.9\text{ }\mu\text{m}$  and columnar grains  
9 with an average diameter of  $0.1\text{-}5.0\text{ }\mu\text{m}$ ,

10          forming a third layer of a smooth  $\kappa\text{-Al}_2\text{O}_3$  having a thickness of  $0.5\text{-}5.5$   
11  $\mu\text{m}$ , and

13

12 forming the layers such that the total thickness of the first and second  
13 layers is 0.5-4.0  $\mu\text{m}$ , and the total thickness of all layers is 2.0-6.0  $\mu\text{m}$ .

1 11. The method of claim 10, wherein the step of forming the first layer  
2 further comprises providing the first layer with  $y > x$  and  $z < 0.2$  and a thickness  
3 of 0.1-0.6  $\mu\text{m}$ .

1 12. The method of claim 10 wherein the step of forming the second layer  
2 further comprises using acetonitrile as the carbon and nitrogen source and forming  
3 the second layer at a temperature of 850-900°C, the step of forming the second  
4 layer further comprises providing  $z = 0$ ,  $x > 0.3$  and  $y > 0.3$ , a thickness of 1.5-3.0  
5  $\mu\text{m}$ , and with the columnar grains having an average diameter of 0.1-2.0  $\mu\text{m}$ .

1 13. The method of claim 10, wherein the third layer is provided with a  
2 thickness of 0.5-3.0  $\mu\text{m}$ .

1 14. The method of claim 10, wherein the method further comprises  
2 forming an outer layer of TiN having a thickness of  $< 1\mu\text{m}$ .

1 15. The method of claim 10, wherein the method further comprises  
2 providing the first and second layers with a total thickness of 1.5-3.5  $\mu\text{m}$ , and a  
3 total thickness of all layers of 3.0-5.0  $\mu\text{m}$ .

1 16. The method of claim 10 wherein the said cemented carbide body has a  
2 cobalt content of 9-12 weight % and 0.4-1.8 weight % cubic carbides of Ta and  
3 Nb.

1            17. The method of claim 10, wherein the cemented carbide body has a  
2 cobalt content of 10-11 weight %.

1            18. The method of claim 17, wherein the cemented carbide body has a CW-  
2 ratio of 0.82-0.90.

1            19. The method of claim 14, wherein the outermost TiN-layer is removed  
2 along a cutting edge.

1            20. The method of claim 19, wherein the outermost TiN-layer is removed  
2 by brushing.

15